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ABSTRACT

A 30-year longitudinal study was undertaken in order to document the course, and determine the outcome, of all pregnancies in a community of Asian Americans on Kauai, the western most of the Hawaiian Islands and equidistant from the continental United States and Japan. The project's goal was to document both the good and poor outcomes of the children's development by focusing on the children's vulnerability--susceptibility to negative environmental factors--and the roots of their resiliency--ability to cope with biological and psychosocial risk factors. The study population consisted of all live births among ethnically Hawaiian, Pilipino, and Japanese residents. Public health officials, physicians, teachers, and social workers cooperated to collect the data. Findings indicated that during the period of time which began with pregnancy and ended two decades later, the reproductive and care-taking casualities amounted to about half of those conceived and one-third of those born alive. In addition, three out of four children with four or more risk factors developed problems, while one out of four exhibited resiliency. Resilient children exhibited many stress-reducing characteristics. A follow-up study looked into resilient and high risk groups after 30 years, and determined the most stressful events and most successful coping mechanisms; the latter included: (1) genetically based dispositional attributes; (2) strong affectional ties to the family; and (3) external support systems that rewarded the individual's competencies. (SKC)

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Vulnerability and Resiliency:

A longitudinal study of Asian Americans from birth to age 30.[1]

Emmy E. Werner

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USA

I would like to thank the ISSBD Program Committee and our Japanese hosts for the opportunity to share with you some of what I have learned from a longitudinal study of Asian-American children on Kauai, an island equidistant between the USA and Japan.

Our principal goal was to document the course of all pregnancies and their outcomes in an entire community, from the women's first menstrual period until their offspring reached adulthood. By obtaining a body of carefully collected data on the children's development over an extended period of time, we hoped to set in perspective the good outcomes as well as the poor.

We began by examining children's vulnerability, i.e., their susceptibility to negative developmental outcomes after exposure to perinatal stress, poverty, parental psychopathology and disruption of their family unit. As our study progressed, we also looked at the roots of resiliency in those children who successfully coped with such biological and psycho-social risk factors.

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[1] Invited address at the IXth Biennial Meeting of the International Society for the Study of Behavioral Development, Tokyo, July 15, 1987. This research was supported by the William T. Grant Foundation, New York, and by the Sidney S. Stern Foundation, Los Angeles.

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As our prospective study has now "come of age," we can contrast not only the development of children exposed to reproductive stress and caregiving deficits and low risk comparison groups, but also the differential course of high risk children who did and did not develop serious and lasting disabilities and disorders.

Like the other investigators engaged in this enterprise, I hope that an understanding of the factors that pull children toward or away from developmental hazards at different stages of the life cycle will aid our efforts at primary prevention.

I would like to briefly highlight some of the milestones on a 30 year's journey that spans the life-time of the infants now grown into young adulthood - a journey that has taken me repeatedly to the small island of Kauai, some 100 miles northwest of Honolulu.

My experience is best expressed in the lines of a poem by the Japanese psychologist Sadi:

> Of journeying, the benefits are many
> The freshness it brings to the heart,
> The seeing and hearing of marvelous things,
> The meeting of unknown friends...

The setting of the study

Let me introduce you to the island on which our study took place and to its people, descendants of immigrants from East Asia who came to its shores with the dream of a better life for their children.

Kauai, "the Garden Island," is the westernmost county of the United States. Kauai was settled in the 8th century by canoe voyagers from the

Marquesas and the Society Islands, and populated in the 12th and 13th century by migrations from Tahiti. Captain Cook "rediscovered" the island in 1778, and Christian missionaries established their first churches and schools there in 1820, at a time when Kauai was an independent kingdom. In 1835, the first sugar plantation was founded, creating an industry that has dominated the island's way of life ever since.

The study population

The 40,000 people who live on Kauai today are for the most part descendants of immigrants from Japan and the Philippines who came to work for the plantations. Many subsequently intermarried with the local Hawaiians. The Japanese, Pilipino and Part-Hawaiians now account for three fourths of the island's population. Portuguese from the Azores, Chinese, Koreans and a few Caucasians make up the rest.

The Japanese began to arrive on Kauai in large numbers in the 1890s. Though poor in material assets, they were rich in human potential. They were educated and valued learning. They also came from an environment more favorable to the health of their infants than Hawaii offered at that time. Rates of infant mortality by prefectures of major migrations were twice as low in Japan as in Hawaii at the turn of the century.

Thanks to their adaptability, diligence and thriftiness, the Japanese immigrants moved quickly from plantation labor to supervisory, business and professional positions. Today they are predominant in the middle class. Their children have the highest educational aspirations among the different ethnic groups on the island. Coming from small families, they value the pursuit of life goals that maintain their status in an

achievement-oriented society, but without losing their sense of obligation to their kin.

In contrast, the Pilipino on Kauai descend from sojourners and immigrants who were less educated than the Japanese and who came to Hawaii two generations later, to ease labor shortages. As late as 1950, the median level of education of the Pilipino males in Hawaii was only six grades. Many had come without wives, intending to return to their homeland. Eventually, in middle age, they married brides who joined them from the Philippines, or younger Japanese women.

Today, their offspring, while still in the lower and lower-middle classes and with large families (mean number of children: 5), respond like an upwardly mobile subculture. They tend to identify enough with the mainstream American culture to strive for success and status, while maintaining close family ties.

The Hawaiians, in contrast, are "strangers in their own land." Under the impact of successive immigrations, they lost most of their land and many lives. The Part-Hawaiians, through intermarriage with the immigrants, are the fastest growing ethnic group in the island. They tend to have large families (mean number of children: 6) and prefer a life style that values cooperation, inter-personal relationships and spontaneity. Hawaiians love for children and their strong family ties have deep roots in the past and are represented in the ancient petroglyphs on the island.

Most Part- and Full-Hawaiians have remained at the bottom of the socio-economic ladder. Yet comparative studies of high achievers among

them have shown, that, as in the other ethnic groups, mothers can be an influential role model for their sons and daughters, motivating them to do well in school, and to aspire toward higher education and better jobs (Machida-Fricker & Werner, 1976; McNassor & Hongo, 1972). As among the Japanese and Pilipino, the mothers of high-achieving youth have, as a rule, more education than the fathers, and a close, positive relationship with their children.

The historical context of the study

We chose Kauai as the site of our prospective study for a number of reasons: Here we found a population with low mobility, but with access to and coverage by medical, public health, educational and social services that compared favorably with most communities of similar size on the U.S. mainland. Also present was a rich opportunity to study a variety of cultural influences on child-bearing and rearing.

Our hopes were justified: The islanders' unique spirit of cooperation has enabled us to carry out a long-term study of the effects of perinatal stress, poverty, and parental psychopathology on the development of all children born in 1955 with relatively low attrition rates: 96% of the cohort participated in the 2 year follow-up; 90% in the 10 year follow-up; 88% in the 18 year follow-up.

When our study began, Hawaii was still a territory, but in 1959, it became the 50th state of the USA. Statehood brought important political, economic and social changes. Japanese-Americans represented Hawaii in both houses of the U.S. Congress, and eventually a Japanese-American was elected lieutenant-governor and governor. Today the chief executive of

the state is of Part-Hawaiian ancestry. Meanwhile, the war in Vietnam overshadowed the childhood and adolescence of this birth cohort.

Whereas the economy of Kauai had been almost entirely dependent on sugar and pineapple production, the 1960s and 1970s brought a rapid increase of tourist industry (from the US mainland and Japan), a construction boom, an increase in government work force, and in scientific and military installations to the island.

But when this cohort graduated from high school, the OPEC dominated energy crisis hit the industrialized world. In their twenties, they joined the work force during one of the worst recessions in the USA since the Great Depression. Economic necessity as well as the Women's Liberation movement sent the overwhelming majority of women into full-time work in the labor market to compete with the men in an increasingly service-oriented economy. Meanwhile, liberalized abortion and divorce laws brought them options regarding their reproductive and family lives that had been unavailable to their parents.

Methodology

From its conception, this has been an interdisciplinary study (Werner and Smith, 1977, 1982). Public health nurses recorded the reproductive histories of the women and interviewed them in each trimester of pregnancy, noting any exposure to physical or emotional trauma. Physicians monitored any complications that occurred during the prenatal, labor, delivery, and neonatal periods. Nurses and social workers interviewed the mothers in the post-partum period and when the children were 1 and 10 years old. They also observed the interaction of parents

and offspring in the home. Pediatricians and psychologists independently examined the children at ages 2 and 10. They assessed their physical, intellectual and social development, and noted any physical handicaps, and learning or behavior problems.

From the beginning of the study we also recorded information on the material, intellectual and emotional aspects of the family environment, including stressful life events that brought discord or disruption to the family unit.

When the children reached school age, their teachers evaluated their academic progress and classroom behavior. In addition, my colleagues and I administered a wide range of aptitude, achievement, and personality tests in the elementary grades and in high school. We also had, with permission of the parents, access to the records of the public health, educational, and social service agencies in the community, and to the files of the local police and family court. Last, but not least, we gained the perspective of the individual members of the birth cohort when we interviewed them at ages 18 and now at age 30.

While our focus in this study has been mainly on young people who appear <u>vulnerable</u> because of their exposure to biological and psychosocial risk factors, we could not help but be deeply impressed by the <u>resiliency</u> of most children. But our hopefulness was tempered by dismay when we noted, over time, the magnitude of the "casualties," many of whom could have been prevented by early diagnosis and early intervention.

RESULTS

The reproductive and caretaking casualties

We noted that deleterious biological risk factors exerted their peak influence in the early weeks of pregnancy when 90% of the fetal losses in our study occurred. For 1,000 live births on Kauai, there was an estimated 1,311 pregnancies that had advanced to four weeks gestation. Two hundred and eighty-six ended in early fetal deaths (before 20 weeks gestation) and only 25 in late fetal deaths (between 20 weeks gestation and delivery). All deaths within 28 days after birth were attributable to perinatal complications, as were three-fourths of the deaths occurring before the 2 year follow-up. (The Japanese had the lowest infant mortality rates, the Part-Hawaiians the highest).

The 1,000 live births yielded 865 surviving children at age 2 who were free of any observable physical defects and whose intellectual and social development had proceeded at a normal rate. By age 10, only 660 of these children were functioning adequately in school and had no recognizable physical handicaps or learning and/or behavior problems.

By age 18, the number of survivors who had not developed any serious coping problems in the second decade of life (such as delinquencies and/or mental health problems) had shrunk to 615. THUS DURING THE SPAN OF PREGNANCY AND THE FIRST TWO DECADES OF LIFE THE REPRODUCTIVE AND CARE-TAKING CASUALTIES IN THIS COMMUNITY AMOUNTED TO ABOUT ONE HALF OF THOSE CONCEIVED AND TO ONE THIRD OF THE LIVE-BORN. (Werner, in press).

On Kauai, as on any battlefield, not all of the casualties died: Approximately <u>one out of every three</u> surviving children in this birth

cohort developed learning and/or behavior problems during the first decade of life that interfered with their school achievement. (By age 10, more than twice as many children needed some form of remedial education and/or mental health services than were in need of medical care.) By age 18, one out of every five youth had a delinquency record, and one out of ten had mental health problems that required in-or-out-patient care.

Among the children and youth with significant learning and behavior problems the poor were overrepresented. This was true for each ethnic group on the island, except for the Japanese: At every social class level, whether middle, working or lower class, Japanese-American children had fewer achievement, intellectual and behavior problems than children from the other ethnic groups.

The joint influence of reproductive risk and quality of caregiving environment

The majority or the troubled children in this birth cohort had multiple problems and lived in conditions of chronic poverty and in a disorganized family environment. Among the minority who had been exposed to reproductive risk factors (such as anoxia, low birth weight, pre-term birth), the quality of the caregiving environment markedly attenuated or exacerbated the effects of the biological insults.

This could be seen as early as 20 months: Toddlers who had experienced severe pre/perinatal stress, but lived in middle class homes or were reared in a stable family environment performed nearly as well on developmental tests of sensori-motor and verbal skills as toddlers who had not experienced any reproductive complications. In contrast, the

children with the most severe developmental retardation and major health problems at age 2 had been exposed to both severe perinatal stress and had been reared in a poor or unstable home environment.

The moderating effects of the caregiving environment appeared even more powerful at age 10: Scores on the Primary Mental Abilities test (PMA) were seriously depressed in children from low SES homes, particularly if they had experienced severe perinatal stress. But children with and without serious perinatal complications who grew up in middle class homes achieved mean scores on the PMA above the norm (unless they suffered severe central nervous system damage).

The patterns of the PMA factor scores were similar for the Japanese, the Pilipinos and the Hawaiians, with the Japanese children consistently scoring at a higher level, especially on the numerical, perceptual acuity, and spatial factors.

Both at ages 10 and 18, pre-and peri-natal complications were related to impairment of physical or psychological development only when combined with unfavorable rearing conditions, i.e., when children grew up in chronic poverty, and were brought up by parents with little education, in a family environment troubled by discord, divorce, or parental alcoholism or mental illness. Boys who had been exposed to reproductive stress were more vulnerable in such a disordered caregiving environment than girls who had experienced pre/perinatal complications.

Vulnerable but invincible children

Three out of four children who encountered four or more or such risk factors before the age of 2 developed serious learning or behavior

problems by age 10, or had delinquency records or mental health problems by age 18. But one out of four of the children who had experienced perinatal stress, poverty, parental psychopathology and disruptions of the family unit developed, instead, into competent and caring young adults.

These were children, like Michael, son of a 16 year old Japanese mother, and a 19 year old Pilipino father. Michael was a pre-term birth (weighing 4 lbs. 5 oz.) and spent his first three weeks of life in a hospital, separated from his mother. Immediately after his birth, his father was sent with the Army to East Asia where he remained for two years. By the time Michael was 8 years old, he had three younger siblings and his parents were divorced. His mother deserted the family and had no further contact with her children. His father raised him with the help of his grandparents.

And there was Mary, of Part-Hawaiian and Pilipino descent, born after 20 hours of labor, to an overweight mother who had experienced several miscarriages before this pregnancy, and to a father who was an unskilled farm laborer, with only four years of education. Between Mary's fifth and tenth birthday, her mother had several hospitalizations for repeated bouts with mental illness, after having inflicted both physical and emotional abuse on her daughter.

Yet both Michael and Mary, by age 18, were individuals with high self-esteem and sound values, caring for others, successful in school, liked by their peers, and looking forward to their adult futures.

Protective factors in the lives of resilient children and youth

Looking back over the lives of these 72 resilient individuals (42-F; 30-M), we contrasted their behavior characteristics and caregiving environment with that of the high risk youth who had developed serious coping problems. We found a number of protective factors within the individuals, within their families and outside the family circle that contributed to their stress resistance.

The resilient boys and girls had few serious illnesses in childhood and adolescence and tended to recuperate quickly. Their temperamental characteristics elicited positive attention from family members as well as strangers. As infants they were more frequently described by their caregivers as "very active," "affectionate," "cuddly," and "easy to deal with." They also had fewer eating and sleeping habits that were distressing to their parents than did the high risk infants who later developed serious learning or behavior problems.

As toddlers, the resilient boys and girls tended to meet the world already on their own terms. The pediatricians and psychologists, who examined them at age 20 months, noted their alertness and responsiveness, and their tendency to seek out novel experiences. They were more advanced in communication, locomotion and self-help skills, and tended to engage in more vigorous social play, than the children who developed serious learning and behavior problems.

In elementary school, their teachers noted that they got along well with their class-mates and were able to concentrate on their work; they also had better reasoning and reading skills than high risk children who

developed problems. Though not especially gifted, the resilient children used whatever skills they had effectively. Both parents and teachers noted that they had many interests and engaged in activities and hobbies that were not narrowly sex-typed.

In middle childhood and adolescence, the resilient youth engaged in "acts of required helpfulness" (Rachman, 1978). Many took care of younger brothers and sisters. Some managed the household when a parent was hospitalized; others worked part-time to supplement the family income or to save for a college education.

By the time they graduated from high school, the resilient youth had developed a positive self-concept and a strong faith in the control of their own fate. They displayed a more nurturant, responsible and achievement oriented attitude toward life than their high risk peers who developed serious coping problems. They also showed signs of a healthy androgyny, a blend of both "masculine" and "feminine" interests.

The resilient boys and girls tended to grow up in families with four or fewer children, with a space of two years or more between themselves and their next sibling. Few had experienced prolonged separations from their primary caretaker during the first year of life. All had the opportunity to establish a close bond with at least one caregiver from whom they received plenty of positive attention when they were infants.

Some of this nurturing came from substitute parents, such as grandparents or older siblings, or from the ranks of neighbors and regular babysitters. As the resilient children grew older, they were especially

adept at recruiting such a surrogate parent when the natural parent was unavailable or incapacitated.

Such substitute parents played an important role as positive models of identification, as did the example of a mother who was gainfully and steadily employed. Maternal employment and the need to take care of younger siblings contributed to the pronounced autonomy and sense of responsibility noted among the resilient girls, especially in households where the father was permanently absent because of death, desertion or divorce.

Resilient boys were often first-born sons who did not have to share their parents' attention with many additional children. There were some males in the family who could serve as a role model (if not the father, then a grandfather, older cousin or uncle). Structure and rules and assigned chores were part of their daily routine in adolescence.

The resilient boys and girls found emotional support outside of their own family. They tended to have at least one, and usually several close friends. They relied on an informal network of kin and neighbors, peers and elders, for counsel and support in times of crises. Many had a favorite teacher who had become a role model, friend and confidant for them.

Participation in extracurricular activities played an important part in the lives of the resilient youth, especially activities that were cooperative enterprises. For still others, emotional support came from a youth leader, or from a minister or church group, whether Buddhist, Catholic, or Protestant. With their help the resilient youth acquired a

faith that their lives had meaning and that they had control over their own fate. Their attitudes of hopefulness and optimism was in stark contrast to the feelings of futility and hopelessness expressed by many of the high risk youth with coping problems at age 18.

But we noted that, at 18, the maximum period of risk for mental breakdown was still ahead of the youth and that some of the troubled adolescents might yet develop a sense of coherence in their lives when they entered the adult world of employment, or marriage and parenthood (Werner & Smith, 1982).

Objectives of the 30 year follow-up

Since 1985, we have been involved in a follow-up of the resilient youth and of comparison groups of high risk S's from the 1955 birth cohort who had previously developed problems (school-failures, delinquencies, teenage-pregnancies, mental health problems).

Our follow-up has two general objectives:

(1) To trace the long-term effects of stressful life events in childhood and adolescence on the adult adaptation of men and women who were exposed to poverty, perinatal stress, and parental psychopathology, and

(2) To examine the long-term effects of protective factors (personal competencies; sources of support) in childhood and adolescence on their adult coping.

The present follow-up finds our cohort at a stage which provides an opportunity to reappraise and modify the initial mode of adult living that had been established in the previous decade. The age 30 Transition Period

is biologically the peak of adulthood, a time of great energy, but also among the most stressful of the adult life cycle (Levinson, 1986).

During the 1985-1986, we located some 80% (N: 545) of the survivors of the 1955 birth cohort (24 died before age 30). We have been especially fortunate in locating 235 of the 276 members of the birth cohort who were at "high risk" in childhood. Among them are 180 of the 204 individuals who developed serious learning and/or behavior problems in the first two decades of life and 55 of the 72 resilient individuals who had previously coped successfully with chronic poverty, perinatal stress and parental psychopathology.

The majority of the men and women still live on Kauai. Among them are most of the former "problem children." Some ten percent have moved to other Hawaiian islands (Oahu, Maui, and Hawaii), most to Honolulu. Another ten percent live on the US mainland, mostly in the western states and some two percent live abroad, in Europe, Japan, Australia, and Oceania. Among those who moved away from Kauai are most of the resilient youth.

Instruments

Our follow-up at age 30 combines the use of our previous data base from infancy to late adolescence with an assessment of the S's adult status via structured interviews, questionnaires and community records.

The instruments administered in individual sessions are: A checklist of stressful life events, Rotter's locus of control scale, the EAS adult temperament survey and a structured interview.

The interview assesses the S's perceptions of major stressors and sources of support in their adult lives: In school; at work; in their relationships with their spouses or mates, their children, parents, in-laws, siblings and friends. It concludes with a summary assessment of the person's state of health, satisfaction and well-being at the present state of life.

In addition we have access to the court records on Kauai and the other Hawaiian islands. They contain criminal, civil, and family court files which are open to the public and cover the period since our last follow-up at age 18. These files not only contain major violations of the criminal law, but also information on domestic problems, such as desertion, divorce, delinquent child support payments, and spouse and child abuse. We also have access to the records of the Department of Health which registers marriage licenses, birth and death certificates and maintains a statewide mental health registry.

So far we have data on every member of the 1955 birth cohort with a criminal record (N: 30), or with a "marriage irretrievably broken" (MIB) that led to divorce by age 30 (N: 50). We have follow-up data on the majority of the resilient S's (40/55) and of the teenage-mothers (21/28) in the third decade of life. We also have data on about half of the offspring of alcoholics and of S's that previously had mental health problems or whose parents required care for such problems. We anticipate completion of our data collection by the end of 1987.

Long-term consequences of stressful life events in childhood and adolescence

More stressful life events in childhood were found among the males with a criminal record by age 30 and/or a marriage that had ended in divorce. More stressful life events in adolescence were found among the females whose marriage was irretrievably broken at age 30.

Among stressful life events that contributed to a significantly higher proportion of coping problems among the males, both at 18 and 30, were: The birth of a younger sibling within two years after the boy was born; a father with an alcohol or mental health problem in childhood; serious conflict and/or parental divorce in childhood; mother's remarriage and entrance of a step-father into the family unit in childhood; prolonged father absence or problems in the relationship with the father in adolescence; and financial problems experienced in the teen years.

The majority (58%) of the boys whose fathers were alcoholic or had a mental health problem during childhood; the majority (75%) of the boys whose parents divorced, the majority (75%) of the boys whose mother remarried, and half of the boys whose fathers died in childhood had either a criminal record or a failed marriage by the time they reached age 30.

Among stressful life events that contributed to a significantly higher proportion of coping problems among the females, both at 18 and 30, were: The birth of a younger sibling within two years after the birth of the girl; a mother who was an alcoholic or had a mental health problem during childhood; a mother who was absent in the girl's teens because of

separation or divorce; problems in relationship with the father during adolescence; and teenage pregnancy, marriage and financial problems.

By age 30, forty percent of the pregnant teenagers, and a third of the girls who had married during their teens were divorced, as well as a fourth of the women whose parents had divorced, or who had problems in their relationship with their father during adolescence.

Among stressful life events in childhood and adolescence that had a significant and lasting negative effect on the quality of adult coping for both men and women were:

(1) The closely spaced birth of a younger sibling in infancy (less than two years after the birth of the index child);

(2) Having a same-sex parent with an alcohol abuse or mental health problem in childhood;

(3) The unavailability or absence of a same-sex parent during adolescence (because of separation or divorce); and

(4) Financial problems (in adolescence).

Now let us turn to the other side of the vulnerability coin, and examine some of the protective factors and sources of support that characterized the resilient men and women in early adulthood.

Resilient Men and Women in their Early Thirties

So far, we have interviewed 40 of the 55 resilient men and women whom we have been able to locate at age 30 (M: 16; F: 24). Forty percent each are of Japanese and/or Pilipino descent; twenty five percent are Part- or Full-Hawaiian. All of these individuals had grown up in chronic poverty, and had previously coped successfully with the effects of perinatal

stress, parental psychopathology, and serious disruptions of their family unit.

It bears remembering that their fathers had worked as semi- or unskilled laborers on the sugar plantations, and that they themselves joined the work force during a serious recession. But, in spite of past and present economic constraints, these young men and women, at ages 30-32, are coping well with the demands of one of the most stressful periods in the adult life cycle.

Both the resilient men and women are highly achievement-oriented. With few exceptions (among the women), they have pursued additional education beyond high school. Two thirds have some college education, with a higher proportion of women attending only the local junior college, and a higher proportion of men continuing through graduate and professional school.

The overwhelming majority of women, four out of five, are married, have children and work full-time, predominantly in semi-professional and managerial positions. The men tend to either work in skilled trades and technical jobs or in the professions (engineering, law, ministry).

The men tend to value their work because it is interesting, and gives them an opportunity to hone their skills. The women tend to value its social and interpersonal aspects, and look upon work as a major source of self-esteem. Three fourths of the resilient men and women are satisfied with their current employment status.

The majority of the resilient men and women list "career or job success:" as their primary goal for themselves at this stage of life,

outdistancing by far other objectives, such as "a happy marriage," "children," or "close relations with family."

This is especially noteworthy for the resilient women. Those who have children value for their offspring most "the acquisition of personal competencies," and "achievement."

We note that the women have entered more adult trajectories in their life course than men of the same age. A significantly higher proportion of women than men at this age have made the transition into marriage, parenthood, and a full-time job - a finding also reported by Lowenthal, et al. (1977) in their cross-sectional sample of urban newly weds in San Francisco.

Less than half of the men around age 30 are married, and fewer still have children - a high proportion still live at home and not yet in a committed relationship. The gender difference in life trajectories observed in this cohort may be in part a consequence of the spirit of Women's Liberation, but it may also reflect realistic adaptations to economic stress, similar to those reported by Elder (1974) in Children of the Great Depression for an earlier generation.

Whatever the reasons, there appears to be a greater reluctance among the resilient males in this cohort to make commitments to long-term relationships than among the females (more of the divorced females than males have remarried), and the expectations from such a relationship also differs significantly by gender.

Most of the resilient women (some three out of four) expect intimacy and sharing from such a relationship. Less than half of the men have

similar expectations. A significantly higher proportion of the males than females reported that a breakup of a long-term relationship between 18 and 30 had been a source of great stress to them.

The greatest source of worry among the resilient men and women at this stage in their lives appear to be problems of family members, especially the health of parents or in-laws or divorces among parents or siblings. Work conditions are reported as major worries by a higher proportion of men; a significantly higher proportion of women tend to worry about their children.

In spite of their participation in the work force, the resilient women tend to define their identity in terms of responsibility and caring for others, whereas the resilient men tend to define themselves in terms of their personal accomplishments at the work-place (Gilligan, 1983; Levinson, et al., 1978).

The overwhelming majority of the resilient men and women at age 30 consider personal competencies and determination to be their most effective resources in coping with stressful life events. (On the locus of control scale both M and F score more than two SD above the mean of the standardization group- in the internal direction). Both sexes value the support of a spouse or mate, and faith and prayer as additional sources of help and comfort.

But the resilient women draw on a significantly larger number of additional sources of support than men, that include friends, siblings, parent-in-laws, teachers, mentors and co-workers. In contrast, the resilient men appear to rely almost exclusively on their own resources,

with some additional support from spouses or parents. They derive less frequently emotional support from siblings, and peer friends than women do. Co-workers are considered more often sources of stress for the men than the women, and less often sources of support.

The resilient women report significantly more stressful events in their lives than the men, including change of residence, pregnancy, the death of parents, siblings, spouses, children and close friends. But a significantly higher proportion of men than women in this group report health problems at age 30. Two of three among the resilient men report health problems related to stress, whether ulcers, back problems, fainting spells, or problems with overweight. In contrast, only a third of the women report health problems - mostly related to pregnancy and child-birth (Emergency D and C; C-sections; toxemia of pregnancy; miscarriages; premenstrual syndromes).

But despite some continuing economic worries and the stress of multiple transitions into work, marriage and parenthood, five out of six among the resilient women, and four out of five among the resilient men consider themselves happy or satisfied with their current status in life.

It appears from this preliminary analysis of our 30 year interview data that "resilience in the face of adversity" appears to be a relatively enduring characteristic that has enabled these men and women not only to overcome a difficult childhood and adolescence, but also to cope successfully with transitions into adult responsibilities. But, as at age 18, the resilient women tend to weather stressful life events with less

impairment to their health, and fewer psychosomatic or "internalizing" symptoms than the men, and they also draw on more sources of social support.

Protective factors associated with improvement among problem youth

Not all of the resilient S's are happy and satisfied with their life situation at 30. While none have had periods of sustained unemployment or run afoul from the law, a minority have witnessed the "irrevocable breakdown" of their first marriages (though 4 of the 5 F are happily remarried), and two of the women (one, the daughter of a mentally ill mother) had to seek help from mental health professionals since they graduated from high school.

By the same token we may ask if positive changes have taken place among some of the vulnerable youth who had developed problems during their teens. Are there protective factors operating in their lives that have tilted the balance from vulnerability to resiliency? We have some preliminary follow-up data that may contribute an answer to these questions from two "high risk" groups:

(1) Teenage mothers whose status improved and those whose status deteriorated in the third decade of life;

(2) Delinquents with and without criminal records at age 30.

Protective factors in the lives of teenage mothers

We were able to obtain follow-up information in the third decade of life on 21 of the 28 teenage mothers in this birth cohort. (One had died from cancer.) Ten had established steady and satisfying relationships with a spouse or mate by the time they reached their late twenties and had

improved their financial lot. The other ten were either divorced or separated and had serious financial worries.

Teenage mothers whose lot improved had less anxious, insecure relationships with their caregivers as infants, and a stronger feeling of security as part of their family in adolescence than teenage mothers whose lot deteriorated. A higher proportion of "successful" teenage mothers modeled themselves after mothers who had held a steady job when they were children, and a smaller proportion had problems in their relationship with their father in adolescence.

A sociable disposition, an internal locus of control and more nurturant, responsible and flexible attitudes characterized the teenage mothers whose life improved in their twenties and early thirties. The unimproved group tended to consist of women who were more anxious, dependent and inhibited and believed that events happened to them as a result of factors beyond their control.

A significant proportion of improved teenage mothers had sought additional education beyond high school and prepared themselves for skilled, semi-professional or managerial positions. While they went to school, their sources of child-care and help differed from the teenage mothers who did not seek further education and who are now found mostly in unskilled positions as adults, or who are unemployed. A higher proportion of improved teenage mothers relied on help by siblings, friends or in-laws; among the unimproved, care was mostly extended by the young woman's parents, possibly increasing their dependency. These findings are

similar to those reported by Furstenberg in his follow-up of black teenage mothers in the Baltimore area (Furstenberg, 1980).

Protective factors that kept delinquent youth from adult crime

Thirty individuals (5%) from the 1955 birth cohort had a criminal record by age 30. Among the offenses listed for the 25 M and 5 F in this group were, in descending order: Promotion of harmful drugs; theft and burglary; driving under the influence of alcohol; assault and battery; rape; and attempted murder. While most of the S's with a criminal record at age 30 had been delinquents in adolescence, it needs to be kept in mind that only a minority or all delinquents -- about a third (N: 27/89) had a criminal record by the time they reached their thirties.

The ability to identify at an early age those who are at risk of becoming future criminals is of greater practical importance than the identification of potential juvenile delinquents -- most of whom turned out to be only temporary nuisances -- on Kauai as well as among the London youth from working class neighborhoods who were followed by West (1982) from childhood to adulthood.

Like the British study we found that among the "crime resistant" delinquents there was a much smaller proportion considered troublesome by their classroom teachers and their parents at age 10. Among those who entered an adult criminal career, there was a significantly higher proportion considered dishonest by both teachers and parents; and exhibiting temper tantrums, uncontrolled emotions, and extremely irritable, aggressive and bullying behavior in the classroom and with their peers in middle childhood.

Delinquents who did not commit any adult crimes also had significantly higher scores on developmental examinations in early childhood, and were less frequently considered in need of mental health services by age 10 than those who went on to commit adult crimes.

Last, but not least, the presence of an intact family unit in childhood, and especially in adolescence, was a major protective factor in the lives of delinquent youth who turned out to be only temporary or minor offenders. Only one out of four among the "crime resistant" delinquents grew up in a home where either the mother or the father were permanently absent in their teens. In striking contrast, five out of six of the delinquents with an adult criminal record came from families where either the mother or the father were permanently absent in adolescence because of separation or divorce.

SUMMARY AND CONCLUSIONS

Three types of protective factors emerge from our analyses of the developmental course of this cohort of Asian-American children from infancy to young adulthood. These factors are similar to those reported by Garmezy (1985) and Rutter (1985), for Caucasian children. They include: (1) Dispositional attributes of the individual that may have a strong genetic base, such as activity level, sociability and intelligence; (2) affectional ties within the family that provide emotional support in times of stress either from a parent, grandparent, sibling, mate or spouse, and (3) external support systems at school, work or church, that reward the individual's competencies and provide him with a sense of meaning and an internal locus of control (Antonovsky, 1987).

The findings presented here suggest that such protective factors may have a more generalized effect on adaptation in childhood, adolescence and young adulthood than specific risk factors or stressful life events. They may also have more cross-cultural universality than the risk factors that lead to pathology in a given culture (Werner, 1987).

The qualities that define individual resilience are now being explored in children from different cultural contexts, among black and Caucasian children on the U.S. mainland, and among children in Europe and Australia (as evidenced in this morning's symposium on Risk and Protective Factors). They need to be studied in Japan and other Asian countries where most of the world's children live.

The British child psychiatrist, Rutter (1985), reminds us that many of the protective factors that enhance resilience in "high risk" children operate through both direct and indirect effects, like chain reactions, over time. A major challenge ahead of us is the examination of the individual links in such longitudinal chains (via path analysis and structural equation models).

In discriminant function analyses of our data from the Kauai Longitudinal Study, we have found that constitutional factors within the child (health, temperament) pulled their greatest weight in infancy and early childhood; cognitive skills and household ecology (availability of alternative caretakers) played a major role in middle childhood; and intrapersonal factors (internal locus of control; self-esteem) in adolescence (Werner & Smith, 1982).

At each state, children who were able to elicit predominantly positive responses from their environment, were found to be "stress resistant," or "resilient," even when growing up in chronic poverty, or in a family with a psychotic parent. To the extent that children elicited negative responses from their environment, they were found to be "vulnerable," even in the absence of biological stress or financial constraints.

What determined the range of developmental outcomes that we encountered in our study was not a single risk factor, but the balance between pre- and perinatal risk factors and stressful life events which heightened children's vulnerability and the protective factors in their lives which enhanced their resiliency. This balance shifted with the stages of the life cycle (Werner, 1985).

During the course of our longitudinal study, the predominant conceptual model of human development has shifted from a main effect model (that postulated constitutional and environmental influences that operated independently) to an interactional model (that recognized the interdependence of biological and psycho-social factors as they influence the developing child). During the last decade, thanks to an influential review by Sameroff (1975), a more dynamic transactional model has come in favor that recognizes the child's active, ongoing attempts to organize his world. The recognition of how people make their own environment has gained impetus from the work of Scarr and McCartney (1983) who have recently provided us with a conceptual framework for prospective studies of vulnerability and resilience that needs to be applied cross-culturally

to test its validity. Scarr and McCartney propose three types of genotype ---> environment effects, a passive, and active, and an evocative type. They postulate that passive effects imposed on the child by his/her biologically related parents should decrease from infancy to later childhood, and active effects should increase from childhood to adolescence and adulthood, as people seek environments they find compatible. Genotype ---> environment effects of the evocative sort should persist throughout the different life stages, as individuals elicit different responses from their environment, based on their physical characteristics, temperament, personality, and intelligence. Our preliminary data from infancy to age 30 provide some evidence for these differential effects.

But the balance between stressful life events that heighten vulnerability and protective factors which enhance resiliency, changes not only with the stages of the life cycle, but also with the gender of the individual. Both our own and other American and European studies have shown that boys are more vulnerable than girls when exposed to biological insults and caregiving deficits in the first decade of life. This trend is reversed in the second decade, making females more vulnerable in late adolescence, especially with the onset of early child-bearing. Judging from our follow-up data, in the early thirties the balance appears to shift back again in favor of the women.

As long as the balance between stressful life events and protective factors is manageable for an individual, s/he can cope. But when stressful life events outweigh the protective factors in his life, even

the most resilient individual can develop problems, if not serious coping problems, then perhaps less visible "internalizing" symptoms, such as the health problems we have noted among some of the resilient males in their early thirties.

For the clinicians, intervention in the lives of high risk children and youth means an attempt to tilt the balance from vulnerability to resiliency, either by decreasing an individual's exposure to biological risk factors or stressful life events, or by increasing the number of protective factors (problem solving skills, sources of support) that s/he can draw upon.

For researchers, the challenge of the future is to discover how the chain of direct and indirect linkages is established over time that fosters escape from adversity for vulnerable individuals. And for all students of behavior development, East and West, there is Lao Tzu's wise reminder, dating back some 2,500 years ago that

"All living growth is pliant
and men who stay gentle
are kin of live..."

Tao (The Way of Life)
cca 606 B.C.

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Table 2

Status and Goals of Resilient Males and Females at age 30

(1955 Birth cohort, Kauai)

**Marital Status	M%	F%	*Number of Children	M%	F%
Married	46.7	86.4	None	60.0	22.7
Single	46.7	9.0	One	6.7	22.7
Divorced	6.7	4.5	Two	33.3	36.4
Divorced, remarried	----		Three	----	13.6
			Four or more	----	4.5

Additional Schooling Beyond High School	M%	F%	Current Employment Status	M%	F%
Technical training	26.7	13.0	Professional	26.7	8.7
Junior College	33.3	47.8	Semi-Professional, Managerial	13.3	30.4
Four Year College	40.0	39.1	Skilled trade, technical	40.0	26.1
Graduate/Profess. School	13.3	4.3	Semi-skilled	20.0	17.4
No additional schooling	6.7	21.7	Unemployed	----	17.4

Satisfaction with School	M%	F%	Satisfaction with Current Work	M%	F%
Did very well	55.7	55.6	Satisfied	73.3	72.7
Did adequately	57.1	44.4	Ambivalent	26.7	22.7
Did not do well	7.5	----	Dissatisfied	----	4.5

Goals for Self	M%	F%	***Goals for Children	M%	F%
Self-fulfillment	33.3	17.4	Survival, health	11.1	11.8
Close relation with friends, family	20.0	4.3	Acquisition of personal competencies	44.4	52.9
Career or job success	60.0	65.2	Acquisition of positive values	33.3 33.3	23.5 23.5
Children	20.0	13.0	General satisfaction with life	44.4	17.6

*Expectations from marriage (long-term relationship)

	M%	F%
Permanency, Security	63.6	72.7
Intimacy, Sharing	45.5	72.7
Children	36.4	18.2
Material Comforts	18.2	4.5

*** $p < .001$
** $p < .01$
* $p < .05$

Table 3

Sources of stress, support and satisfaction of Resilient Males and Females

(1955 Birth cohort, Kauai)

*Health Problems	M%	F%
(Stress-related, self-reported)	66.7	34.8
*Worries	M%	F%
Finances, money	28.6	34.8
Spouse, mate	14.3	17.4
Children	7.1	39.1
Work	28.6	8.7
Problems of family members	50.0	39.1
Friends	7.1	----
Social issues	7.1	4.3
*Sources of Support	M%	F%
Own determination, competence	66.7	60.9
Spouse, mate	26.7	43.5
Faith, prayer	26.7	34.8
Parents	26.7	13.0
Siblings	----	8.7
Other family members	----	8.7
Friends	13.3	30.4
Teachers, mentors	----	4.3
Co-workers	----	8.7
Ministers	----	4.3
Mental health professionals	----	8.7
Satisfactions with current status in life	M%	F%
Happy, delighted	33.3	56.5
Mostly satisfied	40.0	30.4
Mixed (somewhat satisfied, somewhat dissatisfied)	20.0	4.3
Mostly dissatisfied	----	4.3
Unhappy	6.7	4.3

* $p < .05$

Table 6

Stressful life events which differentiated significantly between males with and without a record of delinquency and/or mental health problems by 18 and males with and without a record of crime, or divorce by 30 (1955 Birth cohort, Kauai)

Stressful life events	M with and without delinquency and/or mental health problems by age 18 (N: 72 vs 242)	M with and without criminal record by age 30 (N: 24 vs 290)	M with and without divorce by age 30 (N: 26 vs 288)
	p	p	p
Younger sib. born less than 2 yrs. after birth of M	.005	.10	n.s.
Serious conflict between parents (birth-2)	.000	n.s.	n.s.
Serious illness of M (birth-2)	.01	n.s.	n.s.
Mother alcoholic and/or has mental health problems (2-10)	.05	n.s.	n.s.
Father alcoholic and/or has mental health problems (2-10)	.05	.05	n.s.
Mother absent permanently: Separation/divorce (2-10)	.02	.0001	n.s.
Father absent permanently: Separation/divorce (2-10)	.01	.0001	.10
Father absent temporary: at work or war (2-10)	.01	n.s.	n.s.
Mother remarries; stepfather moves in (2-10)	.05	.0001	.05
Conflict between parents (2-10)	.001	.01	n.s.
More than four children in family by age 10	.001	.05	n.s.
Mother alcoholic and/or has mental health problem (10-18)	.001	n.s.	n.s.
Mother absent permanently: Separation/divorce (10-18)	.01	n.s.	n.s.
Father absent permanently: Separation/divorce (10-18)	.02	.001	n.s.
School problems (10-18)	.01	.01	n.s.
Problems in family relationships (10-18)	.005	n.s.	n.s.
Problems in relationship with mother (10-18)	.005	n.s.	n.s.
Problems in relationship with father (10-18)	.0001	.10	n.s.
Financial Problems (10-18)	.01	n.s.	.10

Table 7

Stressful life events which differentiated significantly between females with and without a record of delinquency and/or mental health problems by 18 and females with and without a record of divorce by 30

(1955 Birth cohort, Kauai)

Stressful life events	F with and without delinquency and/or mental health problems by age 18 (N: 60 vs 268)	F with and without divorce by age 30 (N: 24 vs 304)
	p	p
Younger sib. born less than 2 yrs. after birth of F	.0001	.02
Mother alcoholic and/or has mental health problems (2-10)	.0001	.10
Mother worked long-term (2-10)	.0005 (favoring F without problems	n.s.
Sibling handicapped (MR or MH problems)	.01	n.s.
More than four children in family by age 10	.005	n.s.
Parent died (10-18)	.05	n.s.
Mother alcoholic and/or has mental health problem (10-18)	.05	n.s.
Mother absent permanently: Separation/divorce (10-18)	.005	.10
Father absent permanently: Separation/divorce (10-18)	.001	n.s.
Parents in conflict (10-18)	.005	n.s.
School problems (10-18)	.05	n.s.
Problems in peer relationships (10-18)	.01	n.s.
Problems in family relationships (10-18)	.0001	n.s.
Problems in relations with mother (10-18)	.0001	n.s.
Problems in relations with father (10-18)	.0001	.01
Teenage pregnancy	.0001	.001
Teenage marriage	.0001	.02
Financial Problems (10-18)	.0001	.05